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# USSR Report

TRANSPORTATION

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USSR REPORT  
TRANSPORTATION

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## CIVIL AVIATION

### USSR, ITALIAN CIVIL AVIATION OFFICIALS PLAN COOPERATION

Moscow VOZDUSHNYY TRANSPORT in Russian 21 Jun 84 p 3

[Article: "In the Interest of Cooperation"]

[Text] On 19 June talks were concluded between B. P. Bugayev, USSR Minister of Civil Aviation, and C. Signorile, Minister of Transport and Civil Aviation of the Italian Republic, currently in the Soviet Union on an official visit.

During their meeting the two ministers signed a protocol calling for more extensive Soviet-Italian cooperation in the field of civil aviation. This document is a reflection of the positive aspects of the development of cooperation between the Soviet Union and Italy.

Both parties pointed to the positive nature of the course the relations between the two countries has taken in the field of air service and expressed their desire for an improvement and an intensification of these relations.

In the course of their talks the two ministers also touched upon questions of a scientific and technical nature, cooperation in the area of air traffic control and in the construction of airport facilities among others.

The two sides also outlined a series of specific steps which will contribute to the maintenance of this mutually advantageous dialogue on a long-term basis.

Let us recall that regular air service between the USSR and Italy was inaugurated April 20, 1965 with the flight of an Aeroflot aircraft from Moscow to Rome in accordance with a protocol between the civil aviation authorities of both countries signed in Rome on February 22, 1965. In April 1967, the Italian national airline, Alitalia, initiated air service to the USSR.

On March 10, 1969 the two governments signed an agreement on air service between the Soviet Union and Italy, which opened up great possibilities for regular air traffic between the two countries. At the same time, the two parties signed a memorandum which would govern Aeroflot and Alitalia flights beyond the territories of both countries, flights to Japan via transsiberian route among other points.

September 16, 1971 saw the signing of both a protocol supplementing the bilateral agreement between the two governments and a commercial agreement. These documents confirmed the treaty conditions which have remained operative until the present time.

In November 1973 aircraft of both airlines began operating between Rome and Tokyo via Moscow. The transsiberian route, incidentally, the shortest air route between Europe and Japan, has been of great interest to Italian airline officials. Talks held at the beginning of this year were the occasion for the signing of an agreement between Aeroflot and Alitalia permitting the Italian airline to fly widebody aircraft to Japan via the transiberian route. Aeroflot in turn was granted the right to use the Il-86 on flights between the USSR and Italy. In the protocol they signed, the two parties expressed their satisfaction with the concrete steps which had been taken to expand their bilateral relations in accordance with agreements reached earlier.

Moscow, Leningrad and Kiev are now linked by regular flights with both Rome and Milan. Aeroflot and Alitalia aircraft are carrying over 70,000 passengers a year over these routes.

On the occasion of the signing of this protocol, Mr. C. Signorile declared that this document, too, would without doubt constitute an important contribution to the development of Italian-Soviet relations in the field of civil aviation.

The talks were held in an atmosphere of cordial friendship and undertaken in a spirit of mutual understanding.

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## CIVIL AVIATION

### ADVANCED SYSTEM FOR TESTING NEW HELICOPTER TRANSMISSIONS

Moscow VOZDUSHNYY TRANSPORT in Russian 19 Jun 84 p 4

[Article by Geliy Ivanov: "Helicopter Tested, Science Applied in Practice"]

[Text] The reliability and operating life of a helicopter are going to be governed to a considerable degree by the condition of its transmission. Transmission components must be thoroughly bench tested in the course of the manufacturing process. Specialists have now developed economical, highly automated new test systems unlike any others in the world. Doctor of Technical Sciences Geliy Ivanov, leader of a team of inventors and deputy director of the All-Union Scientific Research Institute of Automated Electric Drive, here tells us about these new test systems.

Before a helicopter can "grow stronger wings," all components must be tested on special test apparatus. These devices make it possible to evaluate the reliability and efficiency of the components of the future machine objectively during the process of fabrication itself and to model the behavior of these components under extreme conditions without endangering the life of a pilot.

Up to now there have been two types of helicopter transmission test devices. One type is the near full-scale stand. In this case, an aircraft engine actuates the transmission, while a rotor creates the load. These devices not only test for the limits to the physical capacity of the transmission, they test the capacities of the test personnel as well, what with the fact that the work in this instance has to be done outside in all kinds of weather and that it really doesn't lend itself to automation. Half-scale test stands like this are uneconomical, they consume a great deal of energy and have a negative impact on the environment. To test any new transmission you have to reassembly the test equipment and go through the process of getting it ready all over again, and it is very difficult to reproduce a series of tests in succession.

The second type of test device is what is referred to as a closed mechanical stand. This type of device solves the environmental protection and energy consumption problems, while at the same time it allows test personnel to work under normal working conditions. These devices, too, however, have their own drawbacks. They are expensive because of the complexity of their mechanical loading devices, and they are far from providing us the answers to all our questions.



While these devices can easily be used to model the operation of a transmission at low rates of change in flight profile, they cannot produce the dynamics involved — takeoffs, landings and turns, for example.

Accordingly, the suggestion that from loading a transmission mechanically we go to an electromechanical method and then develop highly automated, energy-saving test systems making it possible to generate loads identically duplicating any flight conditions has proved overall a successful solution to the problem. The electromechanical method involves mounting a motor on the input shaft of the transmission to rotate it and a brake on the output shaft to generate the loads. So what we have in this case is an efficient closed system requiring additional power from an outside source only to compensate lost energy.

It is, of course, no simple matter on Earth to duplicate loads occurring under actual piloting conditions. For a helicopter transmission with all the rotating components of the electric machinery involved is a complicated piece of equipment, a highly ramified system with many different connections. When we rotate it and subject it to given loads, we generate certain resonance phenomena, which distort the natural picture. To suppress them we have developed a device which allows us instantaneously to measure and correct any deviations.

A minicomputerized automated control system, which permits rapid alterations in program, precise duplication of desired regimes, the recording of control parameters and the processing of test results, gives this test system its reliability.

The general-purpose design of these systems is another of their advantages. We have developed test devices for virtually all types of domestically built helicopters. The result has been a substantial improvement in test quality and reliability, sharp decreases in electric power consumption and construction and operating costs and reductions in the number of operating personnel required. The introduction of electromechanical test systems is calculated to account for savings of some 15 million rubles a year.

The scientific and engineering solutions adopted in the development of these systems are protected by USSR inventors certificates and patents in France, the U.S. and Iran.

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## CIVIL AVIATION

### AEROFLOT-KLM COOPERATION NOTED IN BILATERAL MEETING

Moscow VOZDUSHNYY TRANSPORT in Russian 14 Jun 84 p 1

[Article: "Agreement Signed"]

[Text] On May 12 B. P. Bugayev, USSR minister of civil aviation, received Ms. N. Smit-Kroes, minister of transport and public works of the Kingdom of the Netherlands, here in the Soviet Union on an official visit.

During their meeting, which was held in an atmosphere of warmth and cordiality, the two ministers discussed questions concerning the current state of relations between the Soviet Union and the Netherlands in the area of air service as well as the course these relations should take in the future.

Both sides expressed themselves in favor of continued mutually advantageous cooperation between Aeroflot and KLM, the Netherlands' national airline, cooperation which is making an important contribution to the expansion of bilateral trade, economic and cultural relations and helping to increase mutual understanding between the peoples of the two countries.

The two ministers signed an agreement granting Aeroflot and KLM the right to nonstop flight over the Netherlands and the USSR on routes to destinations in a number of third countries.

Addressing his guests from the Netherlands, B. P. Bugayev, USSR minister of civil aviation, pointed out that Aeroflot and KLM are linked by strong and long-standing ties of mutually advantageous cooperation, to which is attached a great deal of importance. The signing of this new document, a document to which the Soviet Government attaches a great deal of value, not only is entirely in line with the commercial interests of the airlines of both countries, it is of great political importance as well.

This agreement, B. P. Bugayev emphasized, will without doubt contribute to the continued development of relations in the field of aviation between the Soviet Union and the Netherlands.

In praising the action the two sides were taking in signing this agreement, Ms. N. Smit-Kroes, minister of transport and public works of the Netherlands, declared that it marks a fundamentally new step in the development of cooperation

between the two countries in the field of aviation and expressed her hope that it will give new impetus to the improvement and intensification of commercial links between KLM and Aeroflot.

Also present at the signing ceremony was E. A. van Agt, ambassador of the Netherlands to the USSR.

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## CIVIL AVIATION

### BRIEFS

AIRPORT CONSTRUCTION IN GEORGIA--Those who have ever been to the rayon center Mestiya in northwestern Georgia, probably 120 kilometers from Kutaisi, will not forget this area. For the fact is that the mountains ringing this small town are indeed beautiful to behold. They attract tourists and hikers. But to pilots the airport here, some 2 kilometers above sea level, means first and foremost certain difficulties in taking off, landing and flying. The new L-410 and, particularly, An-28 are well-suited to mountain conditions. The problem, however, has been the inability of the local airport to accommodate these aircraft. The construction of a new runway recently begun here will help solve this problem. Specialists at Gruzgiprogorstroy were assigned the task of designing the new terminal, and you have to say they have done an outstanding job. The bright stone, glass and metal structure blends in well with the surrounding landscape. The gabled roof along with all characteristic features of the building are based upon tried, age-old popular traditions here. The materials--granite, basalt and the Gantiadi white stone to be used as facing--are all native to the area. The design of the arrival and departure areas, which are to be able to accommodate 300 passengers an hour, and the beautiful panels, mosaics and stained glass work are all done in the national style. [Ye. Papyшева] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 16 Jun 84 p 1] 8963

NEW AIRPORT IN TAJIKISTAN--Asht, Leninabad Oblast--A new airport built in Tajikistan Asht steppe region has begun to receive Yak-40 passenger aircraft. Roads from all farms on the recently developed sovkhozes feed into the new facility. The farmers in this virgin land region have now been provided with convenient air service to other cities and regions of the country. The current five-year-plan period has seen the Asht steppe become Tajikistan's largest irrigation project. Water has already been brought to 13,000 hectares of virgin land. Large orchards and cotton fields now grow here. The assault on the sun-seared steppe continues. Plans call for bringing a total of 60,000 hectares of irrigated land into the rotation here. [TASS correspondent] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 21 Jun 84 p 3] 8963

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## MOTOR VEHICLES AND HIGHWAYS

### OFFICIAL ON PRESENT, FUTURE WORK OF 'AVTOVAZ' ASSOCIATION

Moscow ZA RULEM in Russian No 6, Jun 84 pp 4-5

[Interview with Marat Nagumanovich Farshatov, technical director of the "AvtoVAZ" industrial association, at the Volga Motor Vehicle Plant in December 1983, by 'ZA RULEM' correspondent V. Arkusha: "Plant and Motor Vehicle"]

[Text] /In December 1976 'ZA RULEM' published a conversation of its correspondents with the technical director of the "AvtoVAZ" [Volga Motor Vehicle Plant] industrial association M. Farshatov. The conversation concerned the results of the first years of operation and the problems and prospects for developing the largest production of motor vehicle output in the country. At that time, production of the three-millionth "Zhiguli" was being celebrated and a new model--the VAZ-2106--had begun to come off the assembly line.

The years have passed. -- but not too many I suppose: in December 1983 the tenth anniversary of complete assimilation of VAZ's production capacities passed. It was observed with great events in the life of the association and in development of the motor vehicle economy in our country. The design was drafted and production organized for the four-wheel drive VAZ-2121 motor vehicle, and the basic models were substantially renovated. Calculation began for the ninth million of motor vehicles and the basically new front-wheel drive vehicle--VAZ-2108--was on the line.

So at a moment like this, the journal's correspondent V. Arkusha met with M. Farshatov for a new conversation concerning today and tomorrow for the motor vehicle giant on the Volga. A trip around the plant preceded the conversation. You continually note numerous changes in its panorama. There's an enormous wing of a building where they're making the "Niva." This first model, which was completely developed by the plant's designers and process engineers, quickly received notoriety and recognition. Now vehicles of this kind are coming off the assembly line almost one and a half times greater than was initially planned. Both in the "Niva" wing of the building and in the others--the press, body and machine assembly wing--you notice the machine tools, automatic lines, and manipulators with the "VAZ" emblem on the beds. They were designed and manufactured at the plant during recent years. The VAZ workers operate in a smooth-flowing and coordinated manner. The cleanliness in the shops and the neat clothes of the workers are a pleasure to the eye: VAZ is noted for high production efficiency in "small details" too.

There also are completely new building wings: equipment is already installed in some and construction operations are still in full swing in others. But by the end of this year, components of the new VAZ-2108 will be proceeding from these buildings in a measured stream to the main assembly line. Its assimilation is the main task for which the collective is living. But, of course, the mass production of motor vehicles is continuing at the same time. Our conversation with the technical director began with this subject--how both trends are coinciding in the everyday life of the plant./ [in boldface]

[Question] Marat Nagumanovich, recently they're talking and writing a great deal about the new "Zhiguli's." I'm afraid that somebody has formed the impression that current problems have been put off to the second plan by concerns about them.

[Answer] By no means. We're not relaxing our attention to production, which every 20 seconds provides a finished motor vehicle. I have in mind not only ensuring this rate and maintaining production regularity, but also constantly increasing the quality of series production.

[Question] Please name specific examples.

[Answer] Let's begin with the body: as a matter of fact, every motor vehicle owner is interested in preserving its smart appearance as long as possible and defying corrosion. A great deal here depends on the primers and paints. For example, during recent years an electrophoretic primer with improved protective properties and a new type of second primer (that is applied before the color) was introduced. And if before the body's components were protected by the first primer with a salt resistance of 96 hours, then the primer that is being used now on a polybutadiene base withstands 275 hours of tests in a chamber with salt fog. Beginning next year on one of the lines we're preparing to change to a more progressive method for applying the priming coat--cataphoretic.

[Question] Of course, everything that is being done to improve the vehicle and prolong its life makes one glad. But the quality of some units and subassemblies is giving rise to just criticisms among consumers. I would like to know in particular how the most acute problem of recent years--the increased wear of camshafts--is being resolved.

[Answer] Work is being conducted in several directions. In the first place, the wear resistance of the "cam shaft lobe and valve drive lever" pair was increased. With that end in view, and having tested different versions of the manufacturing method, our specialists introduced nitriding of the surface of the cam shaft lobes. At the same time they replaced the grade of steel for the lever. The wear resistance of the shaft and the levers more than doubled and that ought to be appropriate for mileage of no less than 80,000 kilometers. Components of this kind are installed on all, and I emphasize all, vehicles since April of 1982. Work on increasing the extended service life of the shafts and levers is continuing, but for its complete success it's necessary that the petrochemists energetically begin improving the quality of motor oils.

[Question] And through what measures is the deficiency of shafts, which are essential for replacing the worn-out ones, being eliminated?

[Answer] The plant is constantly increasing the output of them for spare parts: in 1984 it will exceed 400,000 shafts, and capacities for manufacturing 100,000 more annually will be put in operation. With assimilation of the VAZ-2108 motor, which has a different camshaft, it will be possible on the equipment that has been released to make 220,000 more of these components into spare parts.

An effective manufacturing process was developed as well for restoring camshafts with a facing and nitrating of the lobes. Thus they're already restoring components in our Simferopol SATs [special motor vehicle center]. We are faced with creating similar sections in special motor vehicle centers in a number of oblast cities. Unfortunately, the timeliness of putting them into operation is in question: there aren't enough special machine tools, which are being produced by the Kharkov machine tool building plant, for grinding the faced camshaft lobes. The VAZ workers, and mainly the thousands of motorists in the country, would be grateful to the Kharkov workers (among whom, I'm sure, are quite a lot of "Zhiguli" and "Niva" owners) for manufacturing machine tools over and above the plan. By the way, they're needed for producing spare parts and immediately here in Togliatti.

In addition, a number of enterprises have expressed readiness to produce shafts and levers, which are critical for the time being, as consumer goods. They're already preparing production. For example, I can name the "Serp i molot" ["Hammer and Sickle"] plant in Saratov.

[Question] Judging by your words, the day isn't far off when the "camshaft problem" will become a thing of the past. This is important, but, as the saying goes, a motorist doesn't live "by a spare part alone." The matter of changing to a new vehicle worries him too. I won't mince words: many readers regret that the "Zhiguli" models, which they came to love, soon afterwards will have to yield their place to a vehicle that in many respects is unusual for us.

[Answer] First of all, let's recall: 15 years ago the VAZ-2101 also was "in many respects unusual." Secondly, let's make things clear: our plans do not envisage replacing classically configured models with front-wheel drive ones. They stipulate coexistence of them. The "classics" passed a thorough inspection both under the conditions of our country and abroad. Their reliability and suitability to various conditions are very serious advantages. In short, there are enough grounds to maintain production of models with the classic configuration.

[Question] But won't they turn out to be at the tail end, so to speak, of technical progress? In fact, front-wheel drive vehicles in the "Zhiguli" class already are prevalent abroad.

[Answer] That's right. But not just the configuration itself, but rather the whole totality of the vehicle's qualities determine its value for the consumer. From this point of view, the classical configuration possibilities are still

far from being exhausted. It's no coincidence that very well-known foreign firms--for example, European "Ford" and BMW--are using it. The point is that all vehicles manufactured by us meet the world standard.

[Question] I would like to dwell at greater length on this.

[Answer] The most significant step is assimilation of the VAZ-2105 and VAZ-2107 family. Beginning with the current year, the plant will start gradually to incorporate into the earlier assimilated vehicles a lot of the things that determine the high technical standard of the VAZ-2108 model. This is an electronic ignition system, a new carburetor, and other units and components.

[Question] What will their use provide from the vehicle fancier's point of view?

[Answer] Apart from unquestionable conveniences in servicing, great operating reliability and an 8-10 percent fuel savings.

[Question] From your words does it follow that this is just the beginning of a renovation of the "classic" VAZ models?

[Answer] Quite true. Several years will pass and you'll see a completely new vehicle, and the appearance of which will meet changing tastes and needs.

[Question] What will be the relationship of rear-wheel drive and front-wheel drive vehicles in the over-all production volume?

[Answer] During its first period, it will determine the assimilation rate of the VAZ-2108: assembly of the new vehicle will be done on the same thread of the assembly line from which the VAZ-21013 and the VAZ-2102 are now coming off. In the future, the proportion will depend on the demand for one model or another. While considering the various requirements of customers, side by side with the three-door VAZ-2108 we'll also start soon afterwards to produce the five-door VAZ-2109 on its chassis.

The VAZ-2105 and the VAZ-2107 with modifications occupy a basic place among the classically configured vehicles. A large portion of their components, units and subassemblies are suitable for installing on previous models--the VAZ-2101, the VAZ-2103 and others.

[Question] Does what was said mean that it will be modernized and "universal"?

[Answer] Yes, of course. The VAZ-2105 sedan served as the basis for the new vehicle (its index is VAZ-2104). We're planning to make the "4th" with motors that have a displacement volume of 1,300 and 1,500 cubic centimeters.

[Question] What is the subsequent fate of the "Niva"? What measures are planned for maintaining its popularity?

[Answer] For the time being, profound modernization isn't envisaged. Within the next few years, we'll take measures for reducing fuel consumption and noise



level and for simplifying servicing. At the beginning of next year, we will introduce new and more durable universal joint spiders.

In addition, we're planning to expand the supply system framework in order to satisfy customers' demands more completely.

[Question] I want to talk some more about the VAZ-2108. How is preparation for production going?

[Answer] Rather successfully. The shops basically received the necessary equipment, and, moreover, the proportion of that manufactured by themselves is much more than for the VAZ-2105 family. But the main concern is to complete erection of the building wings on time and to equip the everyday facilities. We're resolving this task hand in hand with the builders and installers.

The possibility of producing the first VAZ-2108 vehicles in time, i.e. during the fourth quarter of the current year, depends to a large extent on the preparation rates of our suppliers of fully complete items. For the time being, many of them are lagging behind. The Borskiy glass plant is slowly assimilating the production of thin, curved glass, and the manufacturers of rubber sealing agents and tires, as well as components made out of plastic, are letting us down. As you see, there are enough complications. And, nevertheless, we have no doubt of success.

[Question] What is such confidence based on?

[Answer] On a knowledge of the collective's resources. People who are enthusiastic about great goals are actively and creatively searching for ways to achieve them. When I say "creatively," then I have in mind not only the designer, the researcher and the process engineer, but also the adjuster, the stamper and the fitter--in short, the working person. The erudite, conscientious and modern worker labors all the more willingly where with every passing day more and more complex tasks confront him. Our plant is precisely that sort of enterprise.

Of course, working conditions help to create an atmosphere of personal interest and a love for the line of work. You probably saw how assemblers in the "old" motor production work in white smocks as if in a clock plant. Of course, cleanliness and order, a precise rhythm and high state of being well organized are inherent also in the production of a new vehicle.

[Question] That is important. But are the conditions that you named enough? As a matter of fact, a white smock doesn't save a person from endlessly repetitive and tiresomely monotonous operations. But for the time being there are still a lot of them in mass production where the count is in the hundreds of thousands of components. It's hardly possible to affirm that similar work is popular today.

[Answer] That's a correct observation. But we proceed from the fact that technical progress is not only the assimilation of new models and not simply the introduction of highly productive equipment, but also the improvement of

working conditions that accompanies them. How is it accomplished? For example, we "entrusted" 1,500 points, which they welded manually for previous models, to machines and automatic machines in welding the VAZ-2105 and the VAZ-2107 bodies. The quality of the bodies increased and it became easier to work.

Another example is the automated line for assembling the gear-box synchromesh units. With its introduction four workers provide the shift program. But earlier, 10 workers--and each one as well, apart from performing monotonous operations--manually moved nearly 3 tons of metal during a shift. I'll note that the equipment in question was designed and manufactured by ourselves.

[Question] Both my personal impressions and the conversation with you are convincing that VAZ is energetically developing its own machine tool building. But is it reasonable to proceed along this route during our century of specialization? Maybe it's well worth allocating more personnel and facilities to the repair of operating equipment--in fact, does it for certain require this?

[Answer] The work experience of VAZ has forced us to look at this problem, like many other things as well, in a different way. Namely, a powerful machine tool base is necessary in order to maintain the efficiency and degree of precision of equipment and to improve the organization of repair. We're now able to manufacture components and units in necessary quantities for many machine tools and on this basis to incorporate the more progressive unit method of repair. At the same time, it's impossible without a solid base to modernize equipment, and for mass production this is one of the main conditions that provides for increasing labor productivity.

Apart from the two tasks that were named, our own machine tool building (the value of its production already is being measured today in tens of millions of rubles!) appreciably facilitates solution of the third: to modernize in a timely manner the vehicle models that are being produced and to assimilate the new ones.

[Question] One may say that machine tool building at VAZ is turning into a powerful support of technical progress.

[Answer] Exactly. However, I'll repeat myself, the main support--more precisely the main engine--of progress is our labor collective. It's an alliance of creative, energetic people and supporters of the plant's trademark.

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## RAIL SYSTEMS

### CHIEF ON TSELIN RAILROAD DEVELOPMENT, OPERATIONS

Moscow ZHELEZNODOROZHNIY TRANSPORT in Russian No 5, May 84 pp 36-41

[Article by N.P.Ovsyanik, chief, Tselin Railroad: "The Labor Contribution of Tselin Railwaymen"]

[Excerpt]

#### New Developments on the Tselin Trunk Line

An important phase in the development of the republic's railway transport was the organization on the basis of the Kazakh trunk line of three independent railroads. The time since elapsed has demonstrated the effectiveness of the measure.

Servicing the transportation needs of Kazakhstan's breadbasket as well as the unique, rapidly growing territorial and production complexes of Pavlodar-Ekibastuz, Karaganda-Temirtau, Kustanay and others, the Tselin railroad came to play a pivotal role in the transportation system of the republic. At the present time it handles over 70 percent of all outward-bound rail cargoes in the republic, including all the coal, 71.6 percent of the grain, 88.5 of the ore, 66.5 of the petroleum and 95.2 percent of the flux.

Progress continues in the improvement of the railroad's material and technical base, in its technological renovation aimed at further expanding the carrying and handling capacities of cargo-intensive routes. Electrification is proceeding at an increasing pace. In the last four years over 1000 kilometers of track have been put under electric power. Today 33 percent of the railroad's overall operational length is electrified. In addition, over 2500 switches have been hooked up to centralized electric control and 2540 kilometers of track equipped with automatic blocking and dispatcher centralization, all of which has led to greater efficiency and higher quality in the carrying process.

The Tselin line has become one of the network's largest grain-handling railroads. The haulage of grain here continues the year round. That is why its organization and improvement receive special attention.

Two thirds of all active cargo-handling stations have spur tracks leading to grain-collecting enterprises. Each year the railroad draws up a plan of organizational and technical measures to control and safeguard haulage of the new harvest, improve the organization thereof and heighten its rolling-stock utilization ratio. Listed in the plan are timely inspection and restoration to working order of covered-car servicing facilities, landings and platforms, machinery for loading and unloading agricultural equipment, as well as repairs of grain-receiving enterprises' sidetracks, updating and expansion of capacity of the main line, the locomotive fleet, power-supply, communications and other technical devices. We are stockpiling materials, spare parts and implements earmarked for repair work on covered cars and on and offloading mechanisms. The railroad's planned organizational and technical measures are coordinated with the plans of oblast grain administrations.

Each year the railroad supplements its own permanent covered-car washing and readying facilities with temporary ones and puts together an operational reserve of covered cars outfitted for grain haulage. We now load grain into covered cars using compaction planks instead of grain shields. This enabled us to utilize in full measure the technical norms and permissible overload of each car and to save on scores of thousands of grain shields annually.

To supervise the flow of outward-bound grain shipments special operational and working groups are organized both at the central office and the sections of the railroad. These groups consist of specialists from the railway traffic, freight and railroad car divisions. Their function is to organize passage and appropriation of covered empties, assign them to various sections, put them under maximum route load and do all the paperwork involved. The railroad's computer center has developed and incorporated into production a computer program to handle operation "Grain". This calls for automated surveillance of the number of ready cars available and the amount of grain unloaded and shipped out by every station, section and oblast.

The railroad is continuously expanding the use of special rolling stock - grain cars - to transport grain. This is the most effective and economical method which does away with the constantly recurring need to ready cars for loading.

In 1980 the collective of our railroad initiated a drive to properly prepare all covered-car washing and repair facilities, sidetracks, freight-handling machinery, equipment, materials, tools, cadres and the various production divisions for grain transportation by Railroad Worker's Day. The initiative was approved by the Ministry of Railways and the Central Committee of the trade union. Since then the Tselin Railroad is each year the first to report on the eve of its professional holiday that it is fully prepared for haulage of the new harvest.

Haulage of agricultural machinery assigned to harvest-gathering is subjected to continuous control. Each year the railroad copes with the reception and unloading of 450 trains at 35 stations prepared in advance. A special command center is set up for the entire period the machinery is on the move. Its job is to oversee the on-schedule passage of the trains and their unloading at the designated stations. All this enables us to bring in the agricultural machinery and ship it back after harvest without delay.

The Tselin railwaymen's prime task is to transport grain and other agricultural produce on time and without loss. And that task is being tackled with a sense of high responsibility before the country, the people and the worker's conscience. Party, trade union and komsomol organizations of our enterprises and sections are directing their mass-political work at mobilizing the railwaymen to implement as quickly as possible the state plan for grain shipments. Storage of the latter in stacks has been discontinued. All this is the result of the creative toil demonstrated by the collectives of leading enterprises, shops, shifts and sectors, by innovators and the best production-line workers, it stems from the evolution of socialist competition, the dissemination of valuable initiatives by station and grain-receiving collectives aimed at successfully moving the grain by ensuring the clockwork performance of every link in the transportation chain.

The CPKa Central Committee, the Ministry of Railways and the Central Committee of the Union of Railway Transport and Transport Construction, the Tselinograd and Kustanay party obkoms have given their approval to the initiatives of the stations and grain-receiving enterprises of Dazharkul', Kustanay, Tobol, Aman-Karagay, Djaltyr' and the Tselin motor column aimed at the successful procurement and transportation of grain and its full preservation. The Aman-Karagay appeal "Not a minute of downtime, not a gram of losses! Let's transport more grain with less cars!" has become the slogan of all Tselin railwaymen. In addition to the major stations, high production results have been achieved by the lesser stations of Azot, Volodarskoye, Tal'shchik, Kzyl-Tu, Surgan, Kovyl'naya, and Zholkuduk. One of the factors conducive to the fulfilment of the grain-shipments plan is the fact that significant defects in incoming cars are eliminated at the loading stations by the railwaymen themselves so that all the rolling stock at hand takes on its share of grain.

Each year the collectives of grain-loading stations draw up, negotiate and get approved the terms of their socialist competition. These stipulate the successful achievement of the target figures for grain loading, the full utilization of the cars' freight-carrying capacity, a reduction in their downtime and the fulfilment of the routing plan.

The decisive role in fulfilling the grain-shipments plan belongs to the wash and rig points for covered cars. The railway's car handlers have created the material base needed to cope with plans for haulage of agricultural produce. At the beginning of the virgin lands campaign we had no such points at all, making do with the laying of temporary dead-ends at loading stations, auxiliary services were located in specially adapted boxcars. Often the grain cars were washed and rigged right on the station tracks. The Ministry of Railways would send in hundreds of workers from other railroads for the duration of the grain-moving period to help fit the cars for carrying grain.

Today we have permanent wash and rig points built by plan and equipped with pumping stations, auxiliary and shower facilities, high wash racks alongside the repair tracks, welding lines and water-mains, electric columns to activate power tools and floodlights for nightwork. As a result, the railroad now fully satisfies the needs of its rigging and washing operations both in terms of mechanisms and personnel. To boost the development of socialist competition between the collectives of the various wash and rig points, enhance moral and material stimuli for increasing the number of cars serviced and improving the quality of that service, the Administration of the railroad and the presidium of the railroad's trade union committee have ratified the terms of competition for the period of mass grain shipments.

A significant contribution to the readying of cars for grain haulage and the implementation of the haulage plan was made by the engineering and technical personnel and office workers of the Kushmurun car depot. They committed themselves to working not less than 40 hours each in their free time on covered-car washing and repairs and called on all their counterparts in the car division of the railroad to actively join in the struggle to increase grain shipments. This far-reaching appeal was upheld not only by the engineering and technical personnel of the car division, but of the railroad as a whole. This enabled us to always have covered cars ready for use even during the peak period of grain shipments.

The engineering and technical personnel, employees and workers of the Tselinograd car depot have initiated broad-based socialist competition for on-schedule, no-loss shipments of grain and organized an additional covered-car major repair unit on the basis of the regular uncoupled car repair shop. In just 48 hours depot personnel installed and activated all the hardware needed for major repair operations: an air conduit, a welding line, racks. A ten-man covered-car repair team was organized and the operational technology drawn up. This resulted in an average of 10 covered cars coming out of major overhaul every 24 hours. The administration of the railroad and the presidium of the trade union gave its approval to the initiative of the Tselinograd car-depot collective. The broad support it received from the railwaymen of our line allowed us to handle thousands of additional tons of grain.

At every phase of the haulage process we have organized active control over the preservation of grain and other agricultural produce. Prior to the mass-haulage season the station masters and freight department workers of grain-loading stations conduct technical training courses for consignors. Taught here are the basic rules of lading, various methods of stowing the grain in the cars and putting up the grain shields, the correct distribution of the grain mass at loading stations and the proper car-sealing techniques. There is a fundamental rule in effect at these stations that cars with self-compacting doors and covered cars stencil-marked "Bread Car" are to be used solely for the carriage of grain, ground products thereof and other food cargoes. The railroad's Center for scientific and technical information and propaganda has issued a poster with the slogan "To grain shipments - a green light!" and diagrams of ways to stow the grain in the covered cars using grain shields, compaction planks and self-compacting doors. These posters also list the measures necessary to ensure the preservation of the grain on board.

Special control posts have been set up to examine and check the grain passing through, especially if it is high-humidity grain. At the mass-loading stations and en route the checking is done by joint special groups. The increasing use of routing procedures by the consignor has led to a speed-up in freight delivery and car turnover, a reduction in their processing at destination points, an economy of material and labor resources and better preservation of the cargo.

The party and the government paid high tribute to the selfless toil of the collective of our railroad. In 1981 the Presidium of the USSR Supreme Soviet awarded the Tselin railroad the Order of the Red Banner of Labor for its success in implementing the directives of the tenth five-year plan in the area of freight and passenger traffic and achieving high techno-economical results in general. This triggered a new surge of labor enthusiasm, an upswing of creative initiative in the matter of utilizing additional reserves to expand the carrying and handling capacity of the railroad, the processing capacity of the terminals and stations and to improve the operational indicators of the railroad as a whole.

#### The labor dialogue of generations

Continuing the traditions of the virgin lands pioneers, the railroad's workforce is resorting to new forms of haulage organization and expanding the use of superheavy, freight trains. We regard the successful runs for the first time in the Soviet Union of trains weighing 15-18 and 30 thousand tons as a manifestation of the unbreakable links between eras, as labor greetings from one generation to another.

The job of driving the first superheavy freight trains was entrusted to the best workers of our railroad, among them bearer of the Order

of the Red Banner of Labor , engine driver first class I.I.Stashkevich. He came to the virgin lands in 1954 after graduation from the Railway school in Lvov. Kazakhstan has become a second motherland to this envoy of the Ukraine.

Last year our railroad fulfilled ahead of time its plan for cargoes shipped out, freight and passenger turnover, a rise in the productivity of labor and a reduction in haulage costs. All cargoes destined for agriculture were delivered in full. The target figure set for the end of the five-year plan for the mean weight of a freight train was topped by 12 tons. Profits earned were in excess of 28 million rubles.

The tasks set by the December (1983), February and April (1984) plenums of the CPSU Central Committee are being implemented with great labor enthusiasm. The collectives of the Tselinograd depot and the Pavlodar section of the railroad launched a drive to mark the 30th anniversary of the development of the virgin lands in a manner worthy of the occasion. Their initiative was supported by many of the railroad's enterprises which today are providing exemplary service to the transportation needs of agriculture. On the eve of the virgin lands jubilee the collective of the Kustanay section called on all the railroad enterprises of the republic to step up their efforts to fulfil ahead of time their five-year plans for cargo haulage in all its nomenclature.

Attaching special significance to and considering the timeliness and the positive influence this initiative will bring to bear on improving the work of the transportation industry, enhancing its efficiency and ensuring the fullest satisfaction of the national economy's freight haulage needs, the Central Committee of the CPK gave its approval to the valuable initiative of the Kustanay section and recommended its extension to all enterprises of trunk-line and industrial railway transport in the Kazakh SSR.

The toilers of the agricultural sector are striving to produce a good crop in the fourth year of the eleventh five-year plan, and they are counting heavily on the support of the railwaymen of the Tselin line. The collective of the railroad has taken upon itself the following very serious socialist obligations: to exceed the 1984 plan for haulage of cargoes for the national economy by 600 thousand tons and for freight turnover by 450 million ton-kilometers. 100 thousand tons of national-economy cargoes will be shipped out above plan by the 30th anniversary of the virgin lands campaign. The grain of the jubilee harvest will be carried without any delays or losses.

Up and down the Tselin railroad spawned by the virgin lands, one after another like in a sprint relay, night and day, in any weather, long trains travel the tracks carrying machines, fuels, spare parts, coal, grain, ore and other economic cargoes. The virgin lands have



fully returned the money invested in them, rewarded the efforts of Soviet toilers with millions of tons of high-grade grain, meat, milk and other agricultural produce.

It was with a feeling of pride for the outstanding victories of our socialist Motherland, for the successes of the internal and foreign policies of the CPSU that the workers of our railroad marked the 30th anniversary of the virgin lands epic. They are dedicating all their experience, energy and know-how to the job of carrying out the main task of the transport industry - providing full and timely transportation service to the national economy and the population.

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## RAIL SYSTEMS

### SOVIET, FRENCH S&T COOPERATION IN RAIL TRANSPORT

Moscow GUDOK in Russian 5 Jun 84 p 3

[Article by V. Antonov, member of USSR-France Society Central Board: "Transport Scientists Collaborate"]

[Text] For two decades the Labor Red Banner All-Union Scientific Research Institute for Railway Transport has been a collective member of the USSR-France Society.

With each year the creative collaboration between Soviet transport scientists and their French colleagues is expanding. It has been developing especially widely in recent years in connection with the decisions of the Joint Soviet/French Working Group; its sessions take place periodically in Paris and Moscow. Thus, work plans were examined and agreed on in coordination with the Research Institute of France on such topics as "Automating train control and traffic management for increased transit capacity" (for the USSR, Candidates of Engineering Sciences N. Penkin and A. Chernyugov, and later, Doctor of Engineering Sciences N. Sukhoprudskiy) "Improving car-freight flow and increasing processing capacity of railway sorting yards" (Candidate of Engineering Sciences Ye. Arkhangel'skiy).

In December last year a work group consisting of VNIIZhT [see first sentence] specialists and the ministry's main administrators was established in the MPS [USSR Ministry of Railroads]. It was headed by S. Pashinin, deputy minister for railroads. Cooperative work with colleagues from France acquired an even more purposeful character. Negotiations with French railway and company representatives are proceeding successfully on equipping one section with French technical traffic control devices integrated with domestic ones, but taking into account our railway line characteristics.

A useful information exchange took place on the topic "Working out technical decisions on reducing noise and vibration in running metro trains." Work-plan projects were also prepared on another topic: "Investigations in the field of building and equipping the railway bed, artificial installations (including tunnels) and the permanent track construction."

Our French colleagues visited the VNIIZhT laboratories repeatedly and gave a high rating to the Institute's experimental zone at the Moscow suburban

station Shcherbinka. In turn, the leading VNIIZhT scientists are visiting France. Professor N. Vorob'yev, doctor of technical sciences, has had a first-hand view of the Lyons-Paris express line. O. Yershkov, doctor of technical sciences, has returned recently from France after visiting the country as a member of a specialists' group by invitation from the Paris section of the France-USSR Society.

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## RAIL SYSTEMS

### AGENDA OF CEMA TRANSPORTATION COMMISSION MEETING IN SOFIA

Moscow GUDOK in Russian 6 Jun 84 p 3

[Article: "Improving Cooperation"]

[Text] The 70th meeting of the CEMA [Council on Mutual Economic Aid] Permanent Commission on Cooperation in the Transport Area took place in Sofia, People's Republic of Bulgaria, 29 May to 1 June 1984.

Delegates from the CEMA-member countries taking part in the session: the People's Republic of Bulgaria, headed by Transport Minister V. Tsenov; the Hungarian People's Republic, headed by Transport Minister A. Pullai; the German Democratic Republic, headed by Transport Minister O. Arndt; the Republic of Cuba, headed by Deputy Transport Minister R. Gonsalez; the Mongolian People's Republic, headed by Ambassador Extraordinary and Plenipotentiary of Mongolia to Bulgaria, L. Damdinzhav; the Polish People's Republic, headed by Railway Minister Ya. Kaminski; the Socialist Republic of Romania, headed by First Deputy Minister for Transport and Railways I. Nikoiescu; the Union of Soviet Socialist Republics, headed by Minister of Railways N. Konarev, and the Czechoslovakian Socialist Republic, headed by Transport Minister V. Blazhek.

In line with the agreement between CEMA and the government of SFRY, [Socialist Federation of the Republic of Yugoslavia], a delegation from SFRY headed by the First Deputy Chairman of the Union Committee for Railways and Liaison A. Grakhor, participated in the meeting.

The 35th anniversary reached this year of the founding of the Council for Mutual Economic Aid was observed. During the period indicated the CEMA-member nations have increased their economic potential many times over. The many-lateral economic, scientific and technical collaboration, including transportation, played an important role in this.

The commission examined the tasks for action that ensued from the CEMA Executive Committee's decrees.

In this connection, the commission determined the order of handling further collaboration issues related to comprehensive development and providing transport links of the CEMA-member countries. This includes accelerating the

rate of rebuilding and modernization of transportation with the aid of scientific and technical progress.

In the commission's work, problems of further improving freight and passenger transport between the CEMA-member countries occupied an important place. It was noted that in 1983, as a result of measures adopted in these countries to raise the organizational level of transport operations and thanks to the implementation of measures in the Long-range Special-purpose Cooperative Program for Developing Transport Links, and carrying out the plans for reciprocal freight shipment and observance of traffic schedules for running of international passenger trains; resulted in improved plan performance. Together with this, the need was recognized for further efforts to ensure uninterrupted operation of transportation in international freight and passenger lines. The Commission reached agreement on measures to improve the quality of freight transport, especially perishables, improve the safety of freight in transit, to increase the operating speed of international passenger trains, and to improve passenger service at stations and on trains. Problems concerning further development and improvement in the activity of the Overall Freight-car Stock and of the Council for Joint Container Use in international communications were examined, as well as a number of issues relating to scientific and technical cooperation and standardization in the transport field. In particular, the Commission approved the program for CEMA-member country cooperation until 1990 on the problem "Development and adoption of rails and railroad ties of improved durability."

The meeting proceeded in a spirit of mutual understanding, constructive cooperation and friendship.

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## RAIL SYSTEMS

### ELECTRIFICATION DIFFICULTIES ON TRANSBAYKAL RAILROAD

Moscow GUDOK in Russian 7 Jun 84 p 2

[Article by A. Sorokin, GUDOK correspondent in Skovorodino-Belogorsk: "Electrification: Has a Lesson Been Learned?"]

[Text] What impresses you most of all about the electrification of Transbaykal's eastern sector is its size. The express is racing on for several hours, and all the time you see on either side contact-line supports that have been set up or the foundation pits for them, and massive structures for traction substations. Stockpiles are being accumulated on the 238-kilometer Shimanovskaya-Skovorodino sector in order to shift it next year to electric traction.

Today the 142-kilometer sector Belogorsk-Shimanovskaya is supposed to be put into service. This might seem as if it weren't all that much compared to the year past, when 215 kilometers were electrified, from Arkhara to Belogorsk. However, still ahead for the electrifiers are large railroad stations, where a great deal of housing and socio-cultural facilities have still to be built.

The results of the labor effort are evident at the starting section. The majority of the supports have been set, and practically all open lines and stations are being readied for finishing work. The work front expanded so much in May for the electroconstruction train of the Transelektromontazh Trust that all efforts had to be concentrated. There should be no delays due to unreadiness of the contact system.

It is something else that is worrisome: lagging as before, the Tsentrobamstroy Trust continues building traction substations at the Ledianaya and Shimanovskaya stations. Up to now, nothing there has been handed over for finishing. The N. Koshman's management, which did a good job in setting up the contact line supports and in a number of construction projects, is now building the Mikhaylo-Chesnokovskaya traction substation with great delays.

The matter is aggravated by the inert attitude of the Minenergo's [Ministry of Energy] Dal'elektroset'sstroy Trust, which is responsible for the construction of a power-supply run to the Mikhaylo-Chesnokovskaya substation. The trust's representatives, complaining of the slow delivery of reinforced concrete and steel parts, are continuing to insist that the Belogorsk-Svobodnyy section

brought on line not during the third quarter as planned, but in the fourth.

The close contact of the N. Koshman administration with the Dal'svyaz'stroy Trust enabled them to lay the protective cable successfully. But Tsentrobamstroy has still not reached an agreement on the necessary work volume for rebuilding the facilities of the Ministry of Communications. So far, the communications people have not yet started on the section from Svobodnyy to Magdagachi.

Since the middle of April, N. Koshman's and V. Volov's administrations are working full blast on the Arkhara-Belogorsk sites that have been handed over to them. However, the construction quality of the technical and service buildings is very inferior.

A large part of the electrification work falls on the shoulders of the Tsentrobamstroy Trust. If the general contractor today must hand over 84 kilometers from Svobodnyy to Shimanovskaya, in 1985 he will have to place 230 kilometers in service. Meanwhile, it is the sixth month of the year, yet construction on the section under way has not really gone full-scale. The work going on at the stations generally involves earth-moving.

The select builders' conference timed for the customer's work inspection was characterized by misups and an organizational mess. It was ascertained that at one place the cable could not be trucked up for over a month; at another they were sitting waiting for reinforced concrete structures. These are available, but nobody had bothered to deliver them.

Not accidentally, many supervisors simply ignored the above-mentioned conference, and so no exchange took place.

V. Plekhotnik, Tsentrobamstroy deputy manager, complains about suppliers. The Omsk plant delays delivery of metal structures for traction substations and rigid cross-piece units; the one at Vorozhba owes 38 tons of guy-wires, and this also holds back construction.

In a word, the impression arises that Glavbamstroy's attention to electrification was inadequate. As in the previous year, Tsentrobamstroy did not fulfill the plan for work and special purpose tasks in the first quarter of this year as determined by the familiar order from two ministries, the MPS [Ministry of Railways] and MTS [Ministry of Transportation Construction]. Work at the startup sector is lagging. Two open lines and one station were not handed over for installation work during the first quarter, as had been intended. And yet the work had been essentially completed there, only small details remained.

The cost of unfinished work is high. The Minenergo's Dal'elektroset'stroy Trust workers demonstrated this effectively. The substation run to the Belogorsk traction substation that they failed to build lowers the operating reliability of the Arkhara-Belogorsk section. Ten persons in the Dal'elektroset'stroy Trust's mechanics' flow line No 103, headed by Chief

V. Shavchenko, have engaged in endless postponement of deadlines to put in four supports.

The electrification staff have all the conditions needed for timely delivery of the Belogorsk-Shimanovskaya starting section and for carrying out a considerable volume of work on their backlog. The only important thing is not to lose time and complete all the earth-moving work. So much cable must still be laid! And if, let's say, it can be laid in Voronezh even in November, remember that in the Transbaykal even September is too late. Delivery of all the cable supply must be on time, not later than by the first half of the year.

But the Transbaykalians won't let us down. The December days in Belogorsk, when a great number of people were hammering at the stone-hard soil, are too well-remembered. Bitter lessons should not pass without a trace.

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## MARITIME AND RIVER FLEETS

### MINISTRY TAKEN TO TASK FOR KHERSON SHIPYARD PROBLEMS

Kiev RADYANS'KA UKRAYINA in Ukrainian 8 Jun 84 p 2

[Article: "'The Ninth Billow of Passions'--After the RADYANS'KA UKRAYINA Article"; indented passages printed double-spaced]

[Text] Correspondence under this title (RADYANS'KA UKRAYINA, 20 April) discussed the fact that the republic's Holovrichflot [Main Administration of the River Fleet] did not promptly and fully respond to the critical remarks made by communists at the party reports-and-elections conference of the Kherson Shipyards imeni Komintern. Shortcomings in the work of the enterprise and the incorrect position of the representatives of the higher economic agency at the conference were pointed out.

Deputy Chief V. Zlachevs'kiy of the UkSSR Holovrichflot and party committee secretary P. Varenichenko have informed the board of editors that after the newspaper article a meeting of the [party] active, at which the problems raised in the publication were discussed, was conducted at the enterprise by the Holovrichflot management. An open, principled discussion took place about the situation which had arisen at the shipyard; precise explanations were given about the goals and paths of development of the enterprise.

There are shortcomings and difficulties in the work of the yard. The fleet assigned to the enterprise has grown in terms of numbers, power, tonnage, and complexity of technical service and maintenance. For this reason, some of the vessels of the shipyard are being serviced in Bulgaria and Yugoslavia. The Dnieper fleet has been augmented, especially by passenger vessels of the 301 type. This has made it necessary to build a new dock at the Kherson Shipyard. Instead, the plan for reconstruction of the slip proposed by the yard has not been adopted, because this would mean renouncing fully any major maintenance of the fleet or construction of vessels at this enterprise for 2 to 3 years. (We note that the representatives of Holovrichflot did not argue this opinion at the conference.)

At the shipyard there is significant turnover in the work force, and the number of workers of the mass trades--vessel assemblers, welders, pipe-fitters, and painters--is decreasing. Holovrichflot plans to remedy the situation by

further improvement of working and living conditions, an increase in construction of housing for the yard, and continuation of reconstruction of the enterprise.

The question of the construction of several shipyards in other republic cities during the next five-year plan is also being studied. This will improve the maintenance of the growing fleet.

The Kherson Obkom of the Communist Party of Ukraine considers the correspondence [under the heading] "The Ninth Billow of Passions" important and timely, reported obkom secretary O. Mel'nikov.

In connection with the questions posed in the newspaper article, the Kherson Oblast Party Committee feels that: the directors of individual administrations of the UkSSR Holovrichflot render insufficient aid to the localities, and at the Shipyard imeni Komintern problems of organization of the technological processes of shipbuilding and maintenance, equipment modernization, effective utilization of the fleet, the increase in the return on investment and labor productivity, and the definition of work indices which would set workers' sights on the attainment of superior ultimate results have not been fully solved.

Today, notes the party obkom, the shipyard management together with Holovrichflot and its services is developing comprehensive measures towards the perfection of economic activity and the improvement of social conditions of the workers and their families.

The party oblast committee continues to oversee progress in acting on the criticisms voiced by communists at the reports-and-elections conference of the party organization of the shipyard imeni Komintern.

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## MARITIME AND RIVER FLEETS

### OFFICIAL ON PROBLEMS OF AGING FLEET; S&T WORK STRESSED

Moscow VODNYI TRANSPORT in Russian 3 Jul 84 pp 1-2

[Article by A. Goldobenko, chairman of the Central Administration of the Scientific and Technical Society of Water Transportation: "Accelerate Scientific and Technical Progress"]

[Text] Among the most important directions of the successful resolution of the tasks put before the maritime and river fleet, a huge role is being assigned to acceleration of scientific and technical progress. Our scientific and technical society (STS) is also following this very path. Suffice it to say that scientists, designers and engineers--STS members, who are working in scientific research institutes, planning and designing organizations and water transportation VUZes, have made a large contribution to the scientific substantiation, development and introduction of new types of ships, advanced loading and unloading operation processes, and to the system of organizing management of the transportation process. On the whole, the activities of the primary scientific and technical societies of the water transportation subdivisions, without a doubt, have had a considerable influence on both the increase in the quality indicators of the work of the fleet and ports and the fulfillment of 3 years of plans of the 11th Five-Year Plan.

The year 1984 will largely predetermine the fulfillment of the entire five-year plan and, consequently, the responsibility of each STS member for his personal contribution toward carrying out this year's goals must also be increased. These goals are characterized by the fact that a basic increase in transportation output must be obtained by virtue of increasing labor productivity.

Successes in achieving the goal at hand will prove to be all the more ponderable, the more persistently STS members strive for the quickest possible introduction of scientific and technical innovations, to increase effectiveness of research work, to conduct a large-scale search for production potential and to focus attention on the most acute problems. This was outlined by the CPSU Central Committee and the USSR Council of Ministers resolution "On measures for accelerating scientific and technical progress in the national economy".

There is much to be done, for example, in order for the maritime fleet to operate at an optimum state and so that the capabilities of the shore base correspond to the level of its technical and technological resources. Primarily, this applies to the specialized fleet (container carriers, RO-RO ships, lighter barges, coal and ore carriers, ships for transporting chemical cargoes and others). As usual, many questions arise with the use of river-sea vessels.

Problems of further improving the activities of transportation centers require the constant attention of the STS of Water Transportation. Here there is someone to compare with and to follow as an example. As it is known, the experience of labor cooperation of the suppliers of the Leningrad Transportation Center was approved of by our party's Central Committee. Fulfillment of this decree is the general direction of the work of transport workers. Creative use of the experience of the Leningrad workers decreases losses at junctions, speeds up freight turnover and lowers shipping costs. And all of this is with minimal capital outlays.

Questions of extending the operational period of the fleet and questions of ship repair require increased attention.

In recent years the rate of fleet replacement has slowed down somewhat. As a result, it has aged noticeably. Whereas in 1975 the average age of the dry-cargo fleet throughout the Ministry of the Maritime Fleet was 8.7 years and the liquid-cargo fleet's was 9.4 years, in 1983 they were 14.2 and 14.7 years respectively. According to forecasts, by 1990 the fleet will be even older. Furthermore, the rate of writing it off will increase and by the end of the 12th Five-Year Plan the balance of the fleet will be lowered. Aging of the fleet will inevitably involve an increase in the amount of ship repairs. Therefore, the scientific and technical society must help seamen and ship-repair workers in every possible way in their efforts to maintain the technical condition of the fleet and in extending the service life of the vessels.

We have many good examples of the proprietary attitude of crews toward their vessels, as a result of which a number of ships have been in operation for 10 years or more without being removed for repair. An outstanding example of such a creative attitude toward maintaining vessels in an excellent technical condition is the crew of the motorship "Severodonetsk" of the Black Sea Steamship Company. The seamen are determined to bring the operational period without putting in for yard repair to 20 years (other than short-term docking for hull cleaning and associated work). The words and deeds of the crew are not at variance. Here is something else that is distinctive: the Severodonetsk is 15 years old, a considerable age, and each year its crew saves 150-170 tons of fuel and 2.5-3 tons of lubricants.

One of the paramount tasks of each STS member connected with the technical operation of the fleet is to study this experience and participate most actively in its introduction on every vessel. Incidentally, this experience confirms once again that it is time, apparently, for our scientists to resolve the problems of standardization, unification and diagnostics of a ship's

machinery and hull, namely by taking into account what the ship's crews can do in this respect.

Matters of the technical condition of ships are becoming critically important for us today. It is known that a number of countries have decided not to allow ships over 15 years old into their ports. In addition, the charges for a port call have sharply increased in some countries and insurance fees have risen. We will not argue about how necessary such measures are. This may possibly be correct on a global scale, but as it applies to one or another ship specifically, one can hardly agree with the above measures.

Let's take our Severodonetsk. This ship has been around a long time and there are many like it in our steamship companies. The question is asked: Why treat both the leading and careless crews the same? Especially since strict monitoring of the technical condition of the ships is prescribed on the part of such reputable universal classification societies as the Register of Shipping of the USSR, Lloyd's and others. In accordance with specified dates, they inspect the ships and issue them documents for going to sea.

With the increase in amounts of ship repair at the same production capacities, it is necessary to pay special attention to reducing the preparatory period, increasing the zero cycle, increasing the shift system coefficient and to the development of measures helping to increase labor productivity sharply. The potential is there, such as reducing the proportion of manual labor, which in ship repair is sometimes over 60 percent, further mechanization and automation of production processes.

Thanks to the creative cooperation of workers of science and production, increasing numbers of diagnostic instruments are being developed every year. Thus, the creative collectives of the Central Scientific Research Institute of the Maritime Fleet, the Baltic Central Planning and Design Bureau and the Baltic Steamship Company planned, manufactured and installed low-speed engine diagnostic instrumentation on the motorship Anna Ul'yanova in 1981. The task of STS members is to intensify the search for and more boldly introduce into the fleet all new achievements in the field of diagnostics. There is great potential here for extending the life of ship machinery and hulls and for saving labor resources.

The problem of reducing the time for preparing ships for repair has been very slow to be resolved for many years. Calculations show, for example, that 17 percent of the total repair time at enterprises of the Black Sea Steamship Company and 10.9 percent at those of the Far East Steamship Company for the year was used up from the time a ship was moored at the yard until repair work started. All told, it was 15 percent throughout the Ministry of the Maritime Fleet. What does this mean? The answer is simple--during this time hundreds of thousands of tons of cargo could have been shipped.

However, if necessary, yard specialists are authorized to make trips for coordination of the maintenance records with the ship's administration. There are also opportunities ahead of time to use the anchorages of ships at the ports for this purpose and norms and standards for the various types of ships

have been developed at the steamship companies. In short, all the resources are there to prepare ahead of time for receiving a ship for repair. If you further take into account that the level of technical operation of our fleet is one of the highest compared to the fleets of other countries, then there is every reason to require the yards to develop such norms which would be above world standards. This being the case, in the past 10 years the norms of average daily output in ship repair were increased by 30 percent in all.

Today the five-year plan for 1986-1990 is being formulated. It will also reflect the questions of ship repair. For instance, it will reflect to which sections to direct capital investments, where to conduct modernization and how to conduct renovation of equipment, achieve a growth in the shift system and speed up the pace of ship repair. Further development of supervisory sections and the brigade contract in ship repair demands special attention. In addition, the STS members ought to lead the search for further improvement of the system of planning indicators and economic incentives for the work of the ship repair yards in order to achieve in the end the largest possible reduction of repair time of the fleet and high reliability of our ships.

Scientific and technical progress is bringing our attention to questions of the economic use of resources, above all fuel and energy resources, for transportation is one of the larger consumers of fuel.

Here are some typical figures. To save one percent of fuel in the maritime fleet means to save more than 70,000 tons of it. Such an amount is enough to operate the Soviet Danube Steamship Company for approximately one year.

A one percent fuel savings in the river fleet equals 16,000 tons. This is enough for the fleet of the Western River Steamship Company to work the entire navigating season.

The STS faces such tasks as struggling for the fulfillment and overfulfillment of plans, developing and assimilating into production efficient fuel-saving equipment and processes, converting machines from liquid to gas and solid fuel, improving the system of standards, accounting and reporting, and all possible support of the initiative of leading crews working under the motto "Stop Fuel Waste".

The STS must participate actively in the development and introduction of measures to determine the optimum speed of ships, taking into account the delivery deadline commitments and the economic feasibility of the optimum mode of machinery operation, the use of various types of fuel, etc. This is especially so, as we already have considerable experience. By way of illustration, the creative brigade of STS members in the Northern Maritime Steamship Company generalized the experienced and developed "A Statement on Operating Vessels at Economic Speeds". The savings in 1983 were 350,000 rubles and nearly 5,000 tons of fuel.

Fuel and energy resources are saved by timely docking and underwater cleaning of marine growth from the hulls and by painting with self-polishing paint. I think that the sections and commissions for material resource economy of the

republic, basin administrations and the primary organizations of the STS of Water Transportation, first of all, must study all these and other directions.

The struggle for speeding up scientific and technical progress is also putting before the STS such a task as the participation in practical realization of the all-union goal-oriented programs and annual plans of the development and introduction of new equipment. As was noted at the Presidium of the Central Administration of the STS in summing up the results for 1983, there are pluses and minuses here. Thus, out of 34 goals for both ministries, 9 were not fulfilled. We will say right out--that is a lot, although the percentage of non-fulfillment of each goal ranged from 0.8 to 5 percent. Consequently, with the proper attention and initiative total success could have been achieved. I think that this must be taken into account in the creative plans and everything must be done to ensure total fulfillment of the goals of 1984.

The STS members are not relieved of responsibility, especially those working in scientific research institutes, design buros and others, when the issue involves orders of new equipment. It must not be inferior in any way to the best domestic and foreign models in its technical and economic indicators. It is no secret that some types of vessels being built today, and means of mechanizing ship, port and ship repair yard work sometime do not meet these requirements. To accept such a situation means deliberately to hamper acceleration of scientific and technical progress.

In the efficient use of the scientific potential, much significance is given to strengthening the ties of science and production, developing a modern base for scientific collectives, and widespread popularization of discoveries and inventions, methods of introducing scientific research and developments and work on improving the technical level and quality of production. To these ends, it is necessary to make more full use of the potentialities of people's universities of economic knowledge and technical progress, various forms of instructing and increasing qualifications of specialists, cooperate more closely with the All-Union Association of Inventors and Efficiency Experts and the Znaniye All-Union Society, and to use more actively the leading experience of the CEMA member-countries in the area of transportation.

Being guided by the resolutions of the 26th Party Congress and the subsequent CPSU Central Committee plenums and by the positions and conclusions contained in the speeches of comrade K. U. Chernenko, General Secretary of the CPSU Central Committee and Chairman of the Presidium of the Supreme Soviet USSR, the huge detachment of STS of Water Transportation members is directing all of its energies and knowledge toward a steady rise in the efficiency and quality of work of the maritime and river fleets and toward the achievement of new gains in communist construction by the workers of water transportation.

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## MARITIME AND RIVER FLEETS

### 'LUCH' CLASS SECOND GENERATION ACV IN OPERATIONAL TESTING

Moscow RECHNOY TRANSPORT in Russian No 5, May 84 p 42

[Article by Yu. Larin, Volga United River Shipping Company: "'Luch' to Replace 'Zarnitsa'"]

[Text] For over 10 years, air cushion vehicles (ACV) of the "Zarnitsa" class have been operating on rivers. Passengers have appreciated these light, fast, roomy vessels--their shallow draft allows them to ply the upper reaches of small rivers. Therefore, "Zarnitsa"-class vessels have become essential for residents of many river settlements. However, in many respects, these vessels, built to class "L" standards of the RSFSR River Shipping Register, do not meet present requirements. Due to the fact that their voyages begin and end, as a rule, on rivers where wave heights can reach 1.2 meters, class "R" ACV's are required. Operating experience has shown that the ZD6N engine, which produces 172 kilowatts (236 horsepower), is not powerful enough. Therefore, under extreme conditions (wide river bends, high waves and during start-up) the engine is overloaded.

In addition, changes and improvements were made in the design of the "Zarnitsa"-class ACV's during series production on the basis of operating experience. Some of these changes could not be incorporated in the 15-year-old design to give optimal results.

<u>Vessel Parameters</u>	<u>"Zarnitsa"</u>	<u>"Luch"</u>
Overall length, meters	22.3	22.8
Beam, meters	3.85	3.85
Overall height, meters	3.3	3.35
Depth, meters	0.8	1.2
Skeg depth, meters	0.45	0.45
Draft in water-displacement position, meters	0.65	0.63
Draft when traveling on air cushion, meters	0.4	0.5
Displacement, tons	14.3	14.2
Passenger capacity, persons	48	51/66*
Engine rating, kilowatts (horsepower)	172 (236)	382 (520)
Loaded speed, km/hour	34	44
Range (fuel capacity), km	300	300
RSFSR River Register Class	L	R

\*including passengers traveling for not more than one hour



For these reasons, it was necessary to develop a new vessel--the "Luch." It is a second-generation, skeg-type ACV. The first vessel of this type was built at the Astrakhan Ship-Repair Mechanical Yard imeni Uritskiy using a design made by the Vympel Special Design Buro. It is a class "R" vessel according to the RSFSR River Register and is equipped with a more powerful engine. The technical characteristics of the vessel and the "Zaritsa" ACV are given in the table.

Aluminum alloy AMg-61 is the basic material used for the welded hull of the "Luch" ACV. The use of one-piece-stamped panels improves the appearance of the vessel and greatly reduces the volume of assembly work.

The wheel house of the motor vessel has been shifted to the left side of the bow. Passengers pass from the boarding area through a single door into the cabine. The boarding area has a folding ladder for boarding and disembarking where no docks are available. The ladder, when folded away, does not extend out from the ship. The wheel house has a cushioned swivel chair for the pilot. Equipment for remote control, monitoring and emergency signalization allows one person to operate the vessel.

The forward-reverse and steering controls consist of two sets of flat rudders and throttles. They are shifted by means of separate controls. The controls make the vessel very maneuverable.

Two-way communications are provided by an ultra-shortwave radio. An Automotive loudspeaker is provided for relaying radio broadcasts, announcements and commands.

The crew lounge is located between the wheel house and the passenger cabin. It is connected with the wheel house and the lobby.

The passenger cabin contains 17 comfortable 3-seat chairs along the windows and racks for newspapers and magazines. The wide windows let in plenty of sunlight and provide a good view. The rooms are heated.

The lavatory, a storage room and a lobby are located behind the passenger cabin.

The engine room is aft.

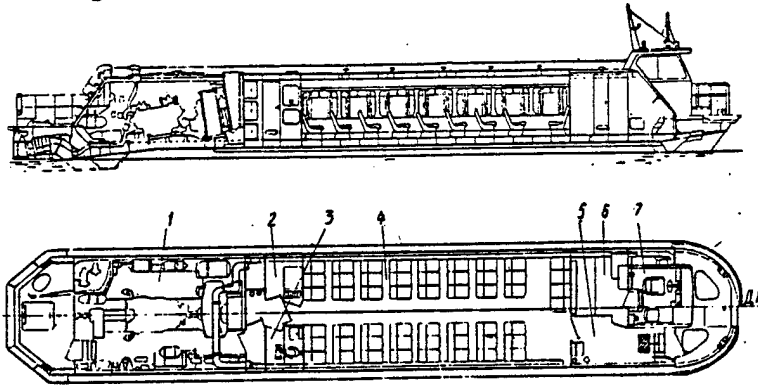
The main engine is a 382-kilowatt, ZKD12N-520 diesel. It powers the water-jet engine through a drive shaft and the air fan through a take-off shaft. The vessel has a chamber air-cushion system, bounded by side skegs, flexible baffles in the bow and the gently sloping arch in the stern. The flexible bow baffle is double-row and is easily removable.

The stern platform of the new vessel is much larger than that of the "Zarnitsa" ACV. It provides more area for docking operations, filling the boat with fuel, oil and water and for discharging bilgewater into service tankers or into on-shore tanks. The platform size and the design of the

water-jet engine make it possible to change the propeller and the rubber-metal support bearing while the vessel is in the water.

The electrical system is 24 volts DC, provided by a 1.2-kilowatt generator mounted on the main engine and by batteries. A hook-up is provided for using 220-volt power from on-shore sources.

The first vessel of the series, "Luch-1", was sent to the Astrakhan Port for operational testing.



Cross section and deck plan of the "Luch" ACV:

Key:

- |                    |                  |
|--------------------|------------------|
| 1. Engine room     | 5. Boarding area |
| 2. Storeroom       | 6. Crew lounge   |
| 3. Lavatory        | 7. Wheel house   |
| 4. Passenger cabin |                  |

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## MARITIME AND RIVER FLEETS

### BRIEFS

NEW ARCTIC SUPPLY SHIP--Nuclear-powered icebreakers help vessel convoys supply goods to the country's northern regions almost year round. But how do you unload the ships? After all, there are, as a rule, no equipped ports in the North. Frequently, they aren't necessary: why build a berth in an isolated area in the tundra, far from any settlement in order to unload goods for, say, a geological expedition? A supply vessel being developed at the Kherson Ship-Building Production Association imeni 60-letiya Leninskogo Komsomola will help solve this problem. The vessel will be able to unload anywhere using two 5-ton helicopters and two air-cushion vehicles that can handle loads up to 40 tons. The supply vessel can accommodate the air-cushion vehicles on board. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 May 84 p 4] 12595

ICEBREAKING FERRIES FOR ESTONIA--(TASS)--A new series of icebreaking ferries will provide year-round service between the mainland and islands in the ESSR. Production of these vessels has begun at the Riga Ship-Repair Yard. These ferries will be able to accommodate 120 passengers and up to 40 automobiles simultaneously. The enterprise's collective plans to put the first vessel in service this year. [Text] [Moscow VODNYI TRANSPORT in Russian 31 May 84 p 1] 12595

FERRY SERVES LENINGRAD, STOCKHOLM--(TASS)--The automobile ferry "Il'ich" has been put into operation, opening regular service between Leningrad and Stockholm. The vessel has completed its first voyage: a large load of van trucks was brought to the Neva Harbor. The ferry will significantly speed shipments from Scandinavia and Western Europe to our country. [Text] [Moscow VODNYI TRANSPORT in Russian 31 May 84 p 1] 12595

FLEET ADDS YUGOSLAV VESSELS--"Shumnyy" and "Konstantin Ol'shanskiy" are the names of two new tankers ordered by the USSR from the Belgrade Shipyard imen Tito. They will soon depart for their home ports--Nakhodka and Nororossiysk. The keels have been laid for two refrigerated ships at the yard, which is one of the largest yards in the SFRY. The refrigerated ships, designed to carry fruits and vegetables, are from a series of 20 similar vessels being built in the SFRY for the Soviet merchant fleet. [Text] [Moscow VODNYI TRANSPORT in Russian 5 Jun 84 p 1] 12595

SHALLOW-DRAFT TUGBOATS INTRODUCED--Pavlovsk, Voronezh Oblast--The Pavlovsk Ship-Building and Repair Yard has begun series production of shallow-draft pusher tugboats. The first vessels in the initial series have been built. They were tested by the Volga-Don Shipping Company. The new tugboats are convenient and economical. The pilot house and mast both fold down to allow passage under low bridges. To fulfill the wishes of the operators, the Pavlovsk ship-builders have promised to finish several more of the pusher tugboats by the end of the year. [Text] [by V. Zhuravlev] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Jun 84 p 2] 12595

LIGHTER-CARRIER ENTERS SERVICE--(TASS)--The lighter carrier "Boris Polevoy" was launched at the shipyard of the Valmet State Corporation in Helsinki. The vessel was ordered by the All-Union Association Sudoimport. The new vessel displaces 9,000 tons and can handle six 1,000-ton lighters. The lighters are loaded on ship by an innovative method of partially submerging the ship. The flag-raising ceremony was timed to coincide with an important date: the 30th anniversary of the All-Union Association Sudoimport. The association has close ties to the Valmet Corporation. Its Helsinki shipyard has built many vessels of various types for the USSR, including large-tonnage lighter-carriers such as the "Yulius Fuchik" and vessels such as the "Magnitogorsk" and the Komsomol'sk", that are capable of handling oversize loads. At present, Valmet is handling a Soviet order for a series of Arctic vessels. [Text] [Moscow VODNYI TRANSPORT in Russian 7 Jun 84 p 1] --Izmail-- The Soviet flag has been raised aboard the light-carrier "Boris Polevoy." The vessel will be part of the Soviet Danube Shipping Company serving the line between Ust-Dunaysk and the Red Sea. The "Boris Polevoy" can accommodate six standard lighters. [Text] [Moscow VODNYI TRANSPORT in Russian 14 Jun 84 p 1] 12595

LIGHTER-CARRIER AUGMENTS FLEET--Ust-Dunaysk, Odessa Oblast (TASS)--The large lighter-carrier system of the Soviet Danube Shipping Company will increase freight shipments between the Danube and Mediterranean and Red-Sea ports. Yesterday, the lighter-carrier "Anatoliy Zheleznyakov" made its maiden voyage. The use of lighters speeds freight handling and increases shipping efficiency. A deep-water area was developed in the Ust-Dunaysk Port to accommodate lighter-carriers. The system will handle over a half-million tons of freight per year. [Text] [Moscow VODNYI TRANSPORT in Russian 16 Jun 84 p 4] 12595

GEORGIAN FLEET ADDS TANKER--Batumi (TASS)--A new vessel has augmented the fleet of the Georgian Maritime Shipping Company. The tanker "I. Broz Tito," built in Split, SFRY, tied up in the Batumi Maritime Freight Port. The vessel is the first of a series of oil-tankers built in the SFRY for the USSR. The 15,000-ton tanker is equipped with electronic communications equipment. [Text] [Moscow VODNYI TRANSPORT in Russian 21 Jun 84 p 1] 12595

CSO: 1829/331

## MISCELLANEOUS

### TRANSPORT FACTORS IN INDUSTRIAL FACILITY RECONSTRUCTION

Moscow PROMYSHLENNOYE STROITEL'STVO in Russian No 5, May 84 pp 25-27

[Article by K. K. Nikulin, candidate of architecture, and N. N. Titova, architect, of the Uralpromstroyniiprojekt [expansion unknown]: "The Role of Passenger Transportation in Reconstructing Industrial Enterprises"]

[Text] Requirements concerning the necessity of taking passenger transportation into account in the system of master plans for large industrial enterprises were included in standardized instructional documents at the beginning of the 1950's. Until enterprises were developed to vast proportions, the problem of transporting workers was resolved by bringing urban passenger transport close to the boundaries of industrial sites. With the extension of enterprises' territory, it has become difficult to provide standardized pedestrian accessibility even by going around the perimeter of an industrial area. This can be observed in examples of the largest ferrous metallurgy enterprises, such as the Magnitogorsk, Krivoy Rog, Novolipetsk and other metallurgical plants. Such a situation, combined with the generally unsatisfactory condition of the system for transporting workers from the city, has required overall resolution of the problem by reducing the amount of time spent by metallurgical plant workers in walking or being transported, which has been carried out by the general systems laboratory of the Uralpromstroyniiprojekt.

The overall approach to the problem cited is not reduced to the solution of a transportation task, but touches on problems of modernizing the architectural layout of the enterprises which have taken shape. Measures to organize passenger transportation will be an important element in arranging an enterprise's architectural layout, especially as the planning of a region in an appropriate stage of expansion loses strict dependence on technology, but the versatility of a planning organization assumes greater importance. This is especially pressing at the present time, when existing metallurgical enterprises have lost the unity of architectural organization, and have actually been turned into a conglomeration of industrial zones and sectors which are distinguished by a chaotic state of construction in progress. Reconstruction of an enterprise's transportation service system should be carried out in the interest of overall improvement in the architectural and spatial structure of the enterprise when the demands of this subsystem are met and it fulfills its basic purpose--ensuring that standardized lengths of time are spent in transportation movements and that there are standardized distances for pedestrian movements in the plant region.

The transportation system of enterprises or an industrial region is a subsystem, a part of a city's transport system. One may speak of developing an enterprise's transportation system only within the limitations determined on the more general level of urban development. The features of an enterprise's transportation systems, such as the means of organizing traffic (high-speed, normal-speed, direct entry by urban transport, and self-contained transport and a combination of them), the method of traffic routing (underground, surface, elevated), and the form of transportation being used are important in order to achieve architectural planning objectives. It is assumed that trolley, bus, trolley bus, and electrified rail transportation may be used at plants, as well as high-speed systems--express bus and high-speed trolley--and future forms of transportation such as a monorail, cabin conveyer [karveyer], and a pedestrian conveyer. It may be assumed that in the future planning the form of transportation will be carried out at the same time as development of the entire system, taking the specific conditions of industrial enterprises into account.

Two aspects of the problems raised will be examined--the planning and composition planning aspects as sequential levels of the concept's materialization into form. The planning level is the material and technical basis, for conditions of the master plan, for shaping the project in conformity with the composition and esthetic principles of space organization on the composition planning level.

From the point of view of establishing a material and technical basis, the enterprise territory should be divided into panels 600-1,200 meters in width, proceeding from the depth of the service zone by one passenger transportation line of 600 meters (Figure 1). The division into panels, performed taking the planning and technological characteristics into account, is also at the same time a means of putting the planning structure of the enterprise in order--the basis of establishing the structure of the multiple levels of territories and transportation flows of various types with the aim of keeping possible cross-overs to a minimum. Based on analysis of a large number of master plans for plants, it has been established that the modulus selected is too large, and one or several industrial sections may be included in a panel. The nature of division into panels and the composition and the siting arrangement of industrial sections in them vary widely and depend on the capacity and composition of the enterprise, the layout of the master plan, the stages of expansion and other characteristics of a metallurgical enterprise. The division into panels should be performed along the industrial flow in parallel with the basic direction of railways. At plants in the first domestic master plan layout, the blast furnace and coal-tar chemical facilities are separated in a special panel at an angle to the others. The division into panels is conducted basically along existing roads or gaps in construction, but there also may be provisional ones necessary only to find a passenger transportation route when alternatives of transport service are being worked out. For final selection of the best transportation service alternative, it is necessary to take into account the conditions for improving the composition and layout structure of the enterprise and its architectural and esthetic appearance.



Figure 1. Division into panels of the territory of operating enterprises in accordance with passenger transportation service conditions

- a. line diagram of the organization of an enterprise layout;
- b. examples: 1--coal-tar chemical facility; 2--blast furnace facility; 3--steel smelting shops; 4--rolling shops; 5--agglomeration plant; 6--machinery and repair shops; 7--warehousing services.

Key: (A) Legend: flows  
(B) Rail freight transport  
(C) Truck transport  
(D) Passenger transport  
(E) Pedestrians

The formation of the layout structure, taking introduction of the new transportation system into account, should be carried out with observance of the principle of conformity of the level of the main transportation or pedestrian artery to the level of the composition center line [kompozitsionnaya os'] or the center of the model of the layout structure. This most general principle of the dependence of the construction of a plant's transportation and pedestrian system and the layout structure will help to avoid fundamental errors which are encountered at operating plants. For example, at the West Siberian Metallurgical Plant, the main composition center line, which is being determined in accordance with the siting of the main shop buildings and emotional reaction, is the longitudinal middle axis, but this main artery at the plant is absolutely unfrequented. The passenger transportation routes pass alongside the plant boundaries, but the main pedestrian routes are in a transversal direction. But after all, by admitting a passenger transportation line on the main internal artery, not only could the perception of the plant's architecture be improved, but the length of passenger transportation lines could be reduced by one-half.

With the expansion and introduction of new transportation systems during reconstruction, the general concept of the organization of an enterprise's territory composition is substantially changed (Figure 2). The initial layout structure remains as though in a first layer, and on its basis, taking changes which have taken place into account, a new layout diagram is constructed. The models of the layout structure based on the new transportation systems are distinguished by greater structural orderliness and by the unity of the composition solution, as well as by adaptability, that is, by the opportunity for future development without disruption of the concept that has been incorporated. Coordination of structural parts, owing to an efficient system of movement, becomes easily readable, and the opportunity emerges of separating the composition accents of individual zones. Introduction of high-speed main urban arteries and main arteries of a higher level in plants' territory will raise the level of their structural organization, which will be expressed in improvement of the grouping of basic transportation arteries for the entire



plant as well. High-speed main arteries will become the axes of concentration for service and administration projects by centering the surrounding installation and a means of creating a favorable psychological microclimate for persons at the facility.

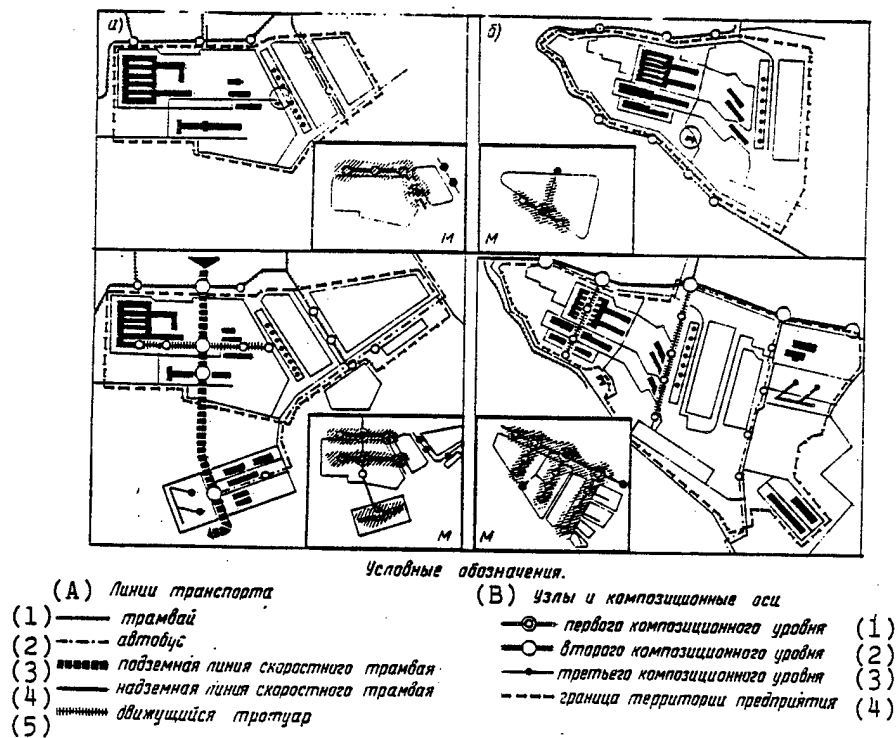


Рис. 2. Реконструкция композиционно-планировочной структуры генплана на основе организации новой системы транспортного обслуживания трудящихся  
а — схема транспортного обслуживания и модель композиционно-планировочной структуры завода первой очереди строительства; б — схема транспортного обслуживания и модель композиционно-планировочной структуры завода второй очереди строительства

Figure 2. Reconstruction of the composition and layout structure of the master plan based on organization of the new transportation service system for workers

- a. diagram of transport service and model of plant's composition and layout structure in the first construction phase
- b. diagram and model in the second construction phase

Key: (A) Transport Lines

- (1) trolley
- (2) bus
- (3) high-speed underground trolley
- (4) high-speed elevated trolley
- (5) pedestrian conveyer

(B) Junctions and Composition Axes

- (1) First composition level
- (2) Second composition level
- (3) Third composition level
- (4) enterprise territorial boundary

To summarize everything stated above, a procedure may be formulated for an overall approach to reconstruction of the architectural and layout structure of the master plan, taking into account the transportation service for workers of operating metallurgical enterprises. Development of a transportation service system should be carried out in parallel with development of the project for overall reconstruction of the architectural and layout structure of an enterprise. Such a concurrent solution of tasks and their mutual adjustment are necessary for common interests. Development of a project should be begun with an analysis of the layout structure of the project being reconstructed, the state of orderliness of its layout structure, and determination of the level and scope of reconstruction being planned, an integral part of which should become reconstruction of the transportation and road network. After the basic principles for constructing the layout structure have been determined and the proposed lines for the flow of passenger transportation have been laid out on the panels and outlined, alternatives for the transportation service are developed. From a broad selection of alternatives, the most specialized to meet the combination of technical and economic indicators is selected. For each transportation alternative, the alternatives for the composition and layout structure and a new scheme for organizing cultural and personal services are developed. Then an evaluation is made of the proposed alternatives in accordance with the perception which may be expressed through a "scenario of visual perception" along the route of movement. The evaluation according to visual perception should take into account the factor of speed of movement, the heights of the route's path, and other effects.

The problem of reducing the amount of time spent for transportation and pedestrian movements at present is pressing for many of the largest metallurgical enterprises, whose territory exceeds 300 hectares. Overall studies to reduce the times spent on transportation and pedestrian movements have been carried out by the Uralpromstroyniiprojekt (V. V. Berzon is in charge of the work) for four metallurgical enterprises: the Krivoy Rog, Nizhniy Tagil, Dneprodzerzhinsk and Vyksa enterprises. When alternatives for the workers' transportation service system were developed, the requirements for improving the architectural and layout structure, the cultural and personal services system, and pedestrian traffic were taken into account. The proposals for the Krivoy Rog Metallurgical Plant (Figure 2) are of particular interest. The use of high-speed transportation, together with the existing normal trolley line and express bus routes, combines into a new system of transportation service for the enterprise. This system makes it possible to approach the formation of a composition and layout plan for an enterprise in an industrial region in a new way. The core of the composition will be a number of public transportation service complexes on a high-speed main artery. On the basis of this, a new type of space-and-time unity of the plant territory and the city may be obtained which is not being achieved by other means. In accordance with this concept, proposals have been worked out for the arrangement and range of centralized public service centers at the stopping points, which substantially changes the plan for developing cultural and personal services proposed by the Ukrqiprommez [Ukrainian State Institute for the Planning of Metallurgical Plants].

The aspect of the problem of reconstruction of the architectural and layout structure of enterprises which has been singled out should be an integral component when the TEO [technical and economic substantiation] or engineering plan for developing large plants is worked out. In this case, coordination and organic unity of the problems of reconstructing the transportation system with other subsystems and with production and technological measures in reconstruction for improving the architectural and layout structure of an enterprise are possible. Working out a plan for development of the composition and layout structure of an enterprise being reconstructed will make it possible to outline more specific measures for organization of the social infrastructure, to coordinate them in time, and to concentrate them in space.

Solution of the problems of the mutual influence of passenger transportation and reconstruction of the architectural and layout structure of an enterprise is an important reserve for improving the social conditions of production and the overall planning of industrial enterprises.

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